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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/588,495

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Frank Forster

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EXAMINER

HENSON, MISCHITA L

ART UNIT

PAPER NUMBER

2857

NOTIFICATION DATE

DELIVERY MODE

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ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

DocketingDept@young-thompson.com

Office Action Summary	Application No. 10/588,495	Applicant(s) FORSTER, FRANK	
	Examiner Mi'schita' Henson	Art Unit 2857	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 November 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3,5,6 and 10-12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3,5,6 and 10-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 August 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This action is responsive to the amendment filed on November 12, 2009. Claims 1, 3 and 5-6 have been amended. Claims 2, 4 and 7-9 have been cancelled. Claims 10-12 are new. Claims 1, 3, 5-6 and 10-12 are pending.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

1. Claims 5-6 are rejected under 35 U.S.C. 102(b) as being anticipated by Geng in US Patent 6,028,672.

Regarding claim 5, Geng teaches:

A method for determining spatial co-ordinates of an object(s) (see three-dimensional surface profile measurement method, Abstract) comprising:

- projecting a pattern (4) with known projection data onto an object (2) (see a projected rainbow color pattern, column 3 lines 44-47; see also see spatially varying color pattern, column 4 lines 52-53 and Fig. 9; see also spatially varying wavelength illumination, column 3 lines 34-36 and column 9 lines 17-18);
- creating an object image (8) with aid of a camera (6) (see captured images, column 4 lines 30-55, column 5 lines 24-28; see also "...a pair of CCD cameras...The images, which contain both intensity and color...", column 2 lines 17-25, column 6 lines 59-61 and Fig. 1);

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- determining the spatial co-ordinates from the known projection data (see three-dimensional surface profile measurement method, Abstract) in a data processing unit (7) (see host computer, column 4 lines 25-26, column 5 lines 66-67 and Fig. 1);

- recording with aid of a further camera (6) a further object image (9) (see "...a pair of CCD cameras...The images, which contain both intensity and color...", column 2 lines 17-25, column 6 lines 59-61 and Fig. 1) and that, if the spatial co-ordinates are determined incorrectly, additional spatial co-ordinates of the object (2) are determined on a basis of the projection data and one of the object images (8, 9) by searching for corresponding image points (S_i , S_r) in the object images (8, 9) (see Two Complementary Stereo Matching Schemes, column 7 line 15 - column 8 line 48) and a subsequent triangulation (see triangulation algorithm/principle, Abstract, column 3 lines 40-41 and Fig. 1; see also active triangulation, column 2 lines 9-50).

Regarding claim 6, Geng teaches the limitations of claim 5 as indicated above. Further, Geng teaches:

The method as claimed in claim 5, wherein corresponding pixels (S_i , S_r) are searched for along epipolar lines (16, 17) (see epipolar line, column 8 lines 20-48 and Fig. 5).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 3 and 10-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Geng in US Patent 6,028,672, in view of Pettersen et al. 2002/0048027.

Regarding claim 1, Geng teaches:

A device for determining spatial co-ordinates of an object(s) comprising:

a projector (3) which projects onto the object (2) (see light projector, column 4 lines 13-16, column 6 lines 42-54, Figs. 1-2 and 9-10; see object, column 4 lines 18-20 and Figs. 1-2 and 9-10) a pattern (4) with known projection data (see spatially varying color pattern, column 4 lines 52-53 and Fig. 9; see also spatially varying wavelength illumination, column 3 lines 34-36 and column 9 lines 17-18);

a camera (6) which creates an object image (8) of the pattern (4) projected onto the object (2) (see "...a pair of CCD cameras...The images, which contain both intensity and color...", column 2 lines 17-25, column 6 lines 59-61 and Fig. 1);

a data processing unit (7) (see host computer, column 4 lines 25-26, column 5 lines 66-67 and Fig. 1) connected downstream from the camera (6), which determines spatial co-ordinates of the object (2) from the object image (8) (see three-dimensional surface profile measurement, Abstract) and the known projection data; and

at least one further camera (6) (see "...a pair of CCD cameras...The images, which contain both intensity and color...", column 2 lines 17-25, column 6 lines 59-61 and Fig. 1) which creates a further object image (9) and the data processing unit (7) determines additional spatial co-ordinates of the object (2) from the object images (8, 9) by a triangulation method (see triangulation algorithm/principle, Abstract, column 3 lines

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40-41 and Fig. 1; see also active triangulation, column 2 lines 9-50), the pattern (4) contains encoded projection data (see “simple and elegant way to encode”, column 4 lines 52-56; see also encodes, column 7 lines 34-38).

Geng differs from the claimed invention in that it does not explicitly teach redundant encoded projection data and restricting the search for corresponding image points to problem areas in which an evaluation of the pattern images only produce an erroneous result.

Pettersen et al. teaches a method and system, using cameras, for determination of relative position and/or orientation of objects by projecting a pattern (Abstract, [0001]-[0008] and Figs. 2, 5 & 6). Further, Pettersen et al. teaches “The method of calculation is bases on minimizing errors (least squares method) such that the redundant information is used” (i.e. redundant encoded projection data and restricting the search for corresponding image points to problem areas in which an evaluation of the pattern images only produce an erroneous result, [0025] and Fig. 2)). Since Pettersen et al. teaches the redundant data is used to minimize errors, it would have been obvious to one of ordinary skill in the art to search the redundant information for corresponding image points to problem areas in which an evaluation of the pattern images produces an erroneous result in order to correct the result, thus minimizing errors.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have combined the teachings of Pettersen et al. with Geng because Pettersen et al. teaches the principle of coordinate determination from the imaging of a common point in two or more cameras and a means for coordinate

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measurement that gives full flexibility with respect to the number of cameras and other features ([0009]-[0014] and [0021]-[0022]), thereby improving the flexibility of the system.

Regarding claim 3, Geng and Pettersen et al. teach the limitations of claim 1 as indicated above. Further, Geng teaches:

The device as claimed in claim 1, wherein epipolar lines (16, 17) pass through a plurality of marks of the pattern (4) (see epipolar line, column 8 lines 20-48 and Fig. 5).

Regarding claim 10, Geng teaches:

A method for determining spatial co-ordinates of an object(s) (see three-dimensional surface profile measurement method, Abstract) comprising:

- projecting a pattern (4) with known projection data onto an object (2) (see a projected rainbow color pattern, column 3 lines 44-47; see also see spatially varying color pattern, column 4 lines 52-53 and Fig. 9; see also spatially varying wavelength illumination, column 3 lines 34-36 and column 9 lines 17-18);

- creating an object image (8) with aid of a camera (6) (see captured images, column 4 lines 30-55, column 5 lines 24-28; see also "...a pair of CCD cameras...The images, which contain both intensity and color...", column 2 lines 17-25, column 6 lines 59-61 and Fig. 1);

- determining the spatial co-ordinates from the known projection data (see three-dimensional surface profile measurement method, Abstract) in a data processing unit (7) (see host computer, column 4 lines 25-26, column 5 lines 66-67 and Fig. 1);

- recording with aid of a further camera (6) a further object image (9) (see "...a pair of CCD cameras...The images, which contain both intensity and color...", column 2 lines 17-25, column 6 lines 59-61 and Fig. 1) and that, if the spatial co-ordinates are determined incorrectly, additional spatial co-ordinates of the object (2) are determined on a basis of the projection data and one of the object images (8, 9) by searching for corresponding image points (S_i , S_r) in the object images (8, 9) (see Two Complementary Stereo Matching Schemes, column 7 line 15 - column 8 line 48) and a subsequent triangulation (see triangulation algorithm/principle, Abstract, column 3 lines 40-41 and Fig. 1; see also active triangulation, column 2 lines 9-50).

Further, Geng teaches the pattern (4) contains encoded projection data (see "simple and elegant way to encode", column 4 lines 52-56; see also encodes, column 7 lines 34-38). Geng differs from the claimed invention in that it does not explicitly teach redundant encoded projection data and restricting the search for corresponding image points to problem areas in which an evaluation of the pattern images only produce an erroneous result.

Pettersen et al. teaches a method and system, using cameras, for determination of relative position and/or orientation of objects by projecting a pattern (Abstract, [0001]-[0008] and Figs. 2, 5 & 6). Further, Pettersen et al. teaches "The method of calculation is bases on minimizing errors (least squares method) such that the redundant information is used" (i.e. redundant encoded projection data and restricting the search for corresponding image points to problem areas in which an evaluation of the pattern images only produce an erroneous result, [0025] and Fig. 2)). Since Pettersen et al.

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teaches the redundant data is used to minimize errors, it would have been obvious to one of ordinary skill in the art to search the redundant information for corresponding image points to problem areas in which an evaluation of the pattern images produces an erroneous result in order to correct the result, thus minimizing errors.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have combined the teachings of Pettersen et al. with Geng because Pettersen et al. teaches the principle of coordinate determination from the imaging of a common point in two or more cameras and a means for coordinate measurement that gives full flexibility with respect to the number of cameras and other features ([0009]-[0014] and [0021]-[0022]), thereby improving the flexibility of the system.

Regarding claim 11, Geng teaches the limitations of claim 10 as indicated above. Further, Geng teaches:

The method as claimed in claim 10, wherein corresponding pixels (S_i , S_r) are searched for along epipolar lines (16, 17) (see epipolar line, column 8 lines 20-48 and Fig. 5).

Regarding claim 12, Geng and Pettersen et al. teach the limitations of claim 10 as indicated above. Further, Geng teaches:

The method as claimed in claim 10, wherein epipolar lines (16, 17) pass through a plurality of marks of the pattern (4) (see epipolar line, column 8 lines 20-48 and Fig. 5).

Response to Arguments

3. Applicant's arguments with respect to claims 1 and 3 have been considered but are moot in view of the new ground(s) of rejection.

4. Applicant's arguments filed November 12, 2009 with respect to claims 5 and 6 have been fully considered but they are not persuasive. Applicant argues:

At page 6 the Office Action asserts (in regards to claims 5 and 6) the GENG is not a two-part combination of a structure-light measurement followed by search, when necessary, of the corresponding triangulation to cover the defective area. More commonly colored features are compared and evaluated. Furthermore, GENG used a very specific so called "Rainbow Stereo 3D camera". The three dimensional depth values in GENG were determined by a triangulation process. It is immaterial if the two recorded images contain intensity and color. GENG thus fails to anticipate a claimed embodiment of the present invention.

Initially it is noted that Applicant's argument is unclear in that it states that the "***Office Action asserts*** the GENG is not a two-part combination of a structure-light measurement followed by search, when necessary, of the corresponding triangulation to cover the defective area" (emphasis added), Claims 5-6 have been rejected under 35 U.S.C. 102(b) as being anticipated by Geng therefore, with respect to claims 5-6, there is no assertion that the reference does not teach part of the claimed in the Office Action.

If the Applicant is intending to argue that the references fail to show certain features of applicant's invention, then in response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., a two-part combination of a structure-light measurement followed by search, when necessary, of the corresponding triangulation to cover the defective area) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read

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into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mi'schita' Henson whose telephone number is (571) 270-3944. The examiner can normally be reached on Monday - Thursday 7:30 a.m. - 4:00 p.m. EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eliseo Ramos-Feliciano can be reached on (571) 272-7925. The fax phone

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number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

02/15/2010

/Mi'schita' Henson/
Examiner, Art Unit 2857

/Carol S Tsai/
Primary Examiner, Art Unit 2857